

The Assessment of the Relationship between Problematic Internet Use and Parent-Adolescent Relationship Quality, Loneliness, Anger, and Problem Solving Skills

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ABSTRACT

The assessment of the relationship between problematic internet use and parent-adolescent relationship quality, loneliness, anger, and problem solving skills

Objective: The main purpose of this study was to investigate relationships between problematic internet use, and parent-adolescent relationship quality, loneliness, anger, and problem solving skills. Another aim of the current study was to find out differences related to sociodemographic variables, such as gender and socioeconomic status in problematic internet use.

Method: The sample was composed of 402 university students. Online Cognition Scale, Parent-Adolescent Relationship Quality Scale, UCLA Loneliness Scale, Problem Solving Inventory and Multidimensional Anger Inventory were used. The statistical analysis of data was conducted by using correlation analysis, analysis of variance (ANOVA), and multiple mediation model test (Bootstrap).

Results: The results revealed that 16.4% of participants had high scores on problematic internet use, and spent 2.7 hours (SD=1.23) a day on the internet on average. Males had higher levels of problematic internet use when compared to females. The results of mediating effects of anger, problem solving, and loneliness on relationship quality between parent-adolescents, and problematic internet use revealed that these variables partially mediated the relationship between negative mother-adolescent relationship and problematic internet use.

Discussion: These results provide helpful tips that can be used in the prevention and intervention programs related to problematic internet use. Psychological counseling and psychotherapy in practice may include strengthening the relationship between adolescents with problematic internet use and their parents. Moreover, following the assessment of their loneliness, and anger levels, and problem solving skills, interventions related to communications skills, anger management, and problem solving approaches may decrease their problematic internet use.

Keywords: Anger, internet, loneliness, problem solving



ÖZET

Problemleri internet kullanımı ile ebeveyn-ergen ilişki niteliği, yalnızlık, öfke ve problem çözme becerileri arasındaki ilişkilerin incelenmesi

Amaç: Çalışmanın temel amacı, problemleri internet kullanımı ile ebeveyn-ergen ilişki niteliği, yalnızlık, öfke ve problem çözme becerileri arasındaki ilişkilerin incelenmesidir. Ayrıca problemleri internet kullanımının cinsiyet ve sosyo-ekonomik düzey gibi sosyodemografik değişkenler açısından nasıl farklılaştığının belirlenmesi de diğer bir amaçtır.

Yöntem: Çalışmanın örneklemini 402 üniversite öğrencisi oluşturmaktadır. İnternette Bilişsel Durum Ölçeği, Ebeveyn-Ergen İlişki Niteliği Ölçeği, UCLA Yalnızlık Ölçeği, Problem Çözme Envanteri ve Çok Boyutlu Öfke Ölçeği kullanılmıştır. Elde edilen veriler; korelasyon, varyans analizi (ANOVA) ve çoklu aracı model testi (Bootstrap) gibi istatistik analiz yöntemleri ile incelenmiştir.

Bulgular: Örneklemin %16.4'ünün problemleri internet kullanımı puanlarının yüksek olduğu ve bu bireylerin günde ortalama 2.7 (SS=1.23) saat internet kullandıkları belirlenmiştir. Erkeklerin kadınlara oranla daha çok problemleri internet kullanımına sahip oldukları bulunmuştur. Çalışmada ebeveyn-ergen ilişki niteliği ile problemleri internet kullanımı arasında öfke, problem çözme ve yalnızlık değişkenlerinin aracı etkisine bakılmış ve bu değişkenlerin olumsuz anne-ergen ilişkisi ile problemleri internet kullanımı arasındaki ilişkide "kısmi aracılık" etkileri olduğu bulunmuştur. Yine aynı aracı değişkenler olumsuz baba-ergen ilişkisi ile problemleri internet kullanımı arasındaki ilişkide de "kısmi aracılık" rolünü üstlenmişlerdir.

Tartışma: Elde edilen bulgular, problemleri internet kullanımının önlenmesi ve tedavisine yönelik müdahale programlarında kullanılabilecek yararlı ipuçları sağlamaktadır. Psikolojik danışma ve psikoterapi uygulamalarında, problemleri internet kullanımı olan bireylerin ebeveynleriyle ilişkilerinin güçlendirilmesi sağlanabilir. Ayrıca bu bireylerin yalnızlık ve öfke düzeyleri ile problem çözme becerileri de değerlendirilerek; iletişim becerileri, öfke kontrolü ve problem çözme yaklaşımları gibi alanlarda yapılacak müdahaleler problemleri internet kullanımının azaltılmasında etkili olabilir.

Anahtar kelimeler: Öfke, internet, yalnızlık, problem çözme

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INTRODUCTION

Internet is one of the most significant and effective tools that science has inserted in our lives. In recent years, as smart phones have become largely available, reaching internet is much easier and number of users is increased. Although increasing use of internet overtime have positive effects, it has brought also addiction/abuse problems of users with itself. Young used the internet addiction, and he developed diagnostic criteria based on diagnostic criteria of “pathological gambling” in DSM-IV (1). In many studies conducted according to these criteria, it was determined that males developed addiction more than females (2-4), and it was noted that addiction was more commonly parallel with the most frequent internet-use age, which was adolescence (5,6). In the literature, there are different terms like “internet addiction”, “internet abuse”, and “problematic internet use”. In the present study, terminology of problematic internet use is preferred.

Widespread problematic internet use increases the interest in this issue, and leads to investigate many variables which may be related. One of these variables is the parent-adolescent relationship quality, which reflects attitudes originated from the history of their relationship (7). The most powerful risk factor was defined as poor parent-adolescent relationship in leading emotional and behavioral problems in adolescents (8). In a study, it was noted that university students who were problematic internet users defined their mothers less protective and close. Moreover, these students reported that both of their parents were over-controlling (6). It was believed that adolescents who could not receive support from their families used internet as a support to cope with this situation (9). In a study from Turkey, problematic internet use scores of adolescents who had parents with attitudes defined as “uninterested”, were determined higher (10).

The other variable known to be related to problematic internet use is loneliness, which is defined as absence of social relationships of individuals or a reaction to absence of closeness, intimidation and emotionality in these social relationships (11). It was commonly emphasized that loneliness was a variable

related to problematic internet use (12-14). It is also known that lonely individuals use internet mostly to meet new people, and to communicate with individuals who have similar fields of interests (15).

Anger is a variable which is known to be related to problematic internet use. In psychology dictionary, it is defined as “an intense, and negative feeling caused in conditions such as frustration, being attacked or threatened, and which may generally end up in somehow hostile behaviors against individuals or conditions” (16). In a study, individuals who are internet addicted, alcohol addicted, and healthy control group were compared for anger factor, and it was determined that anger expression related to hostility was higher in the internet addicted group (17). In two different studies performed in Turkey, it was reported that as problematic internet use was increased, anger expressions got worse (18), and there was a significant correlation between one type of anger expression, self-directed anger, and internet addiction (19).

In the present study, another factor examined was problem solving ability, which is defined as a cognitive-behavioral process during which different effective solution alternatives are prepared, and the probability of choosing the most effective alternative is increased (20). Although problematic internet use may cause many familial, occupational, social, and physical problems (21), individuals cannot prevent themselves from entering the internet, and they have troubles to solve this problem. It seemed that people were using internet more to escape from problems rather than solving. When the literature was reviewed, it was observed that there were few numbers of studies investigating problematic internet use and problem solving abilities. It was concluded after reviewing limited number of studies about this issue that both variables were related to each other (22).

As it is understood from the literature mentioned above, there are different variables related to problematic internet use. Among these variables, parent-adolescent relationship quality, loneliness, anger, and problem solving abilities have been investigated in various studies. Although there are many studies related to loneliness and anger variables,

there are limited number of studies in parent-adolescent relationship quality, and problem solving abilities especially in Turkey. Moreover, there is no study which have investigated these four variables (parent-adolescent relationship quality, loneliness, anger, and problem solving abilities) related to internet addiction. In this context, the obtained data may be helpful in prevention of problematic internet use, which is becoming a widespread issue, and developing intervention programs for treatment. For example, problematic internet use may be tried to be decreased by interventions which evaluate parent-individual relationship quality, loneliness, anger levels, and problem solving ability of individuals during psychological consultancy and psychotherapy in practice.

Therefore, the aim of the study was determined as evaluation of correlations between problematic internet use and parent-adolescent relationship quality, loneliness, anger and problem solving ability. In the context of basic aim of the present study, responses to below mentioned questions were investigated:

1. Is there any significant effect of gender variable on problematic internet use?
2. Is there any significant effect of socio-economic level on problematic internet use?
3. Is there any mediating effects of loneliness variable between parent-adolescent relationship quality and problematic internet use?
4. Is there any mediating effects of anger variable between parent-adolescent relationship quality and problematic internet use?
5. Is there any mediating effects of problem solving between parent-adolescent relationship quality and problematic internet use?

METHOD

Sampling of the study was constituted from undergraduate students who were attending at Hacettepe University, Ankara University, Kirikkale University, Gazi University, and Middle East Technical University, and were selected by easily accessible sampling technique. Participants who did not respond

to the majority of questions, and marked “yes” in the information form to “have had any psychiatric disease within the last 6 months?” were excluded from the study. As individuals who received three points were excluded from the study sample, data analysis was performed on a total of 402 students.

Of participants, 234 (60.4%) were females, and 159 (39.6%) were males, and their age range was 17-25 years (\bar{X} = 20.59, SD=1.85). When the education level of mothers of participants was investigated, mothers of 168 (41.8%) were graduated from the primary school, 50 (12.4%) were graduated from the secondary school, 88 (21.9%) were graduated from the high school, and 83 (20.6%) were graduate from the university. The education level of mothers of 13 participants (3.3%) could not be determined.

Measures

Personal Information Form: This was a form prepared to determine demographic characteristics such as age, gender, education level of mother, and participant’s university by investigators. Also there were questions to collect information about from where the participants entered the internet, the mean duration of daily internet use, and most common reasons of their internet use.

Online Cognition Scale (OCS): It was a Likert type scored scale (from 1 to 7) with 36 items which was developed to measure problematic internet use by Davis et al. (23). High scores indicated that problematic internet use had high rates. Its adaptation in Turkish was performed by Ozcan and Buzlu (24), and Cronbach’s alpha internal consistency coefficient was 9.91, whereas test-retest reliability coefficient was determined as 0.90 for the scale.

Parent-Adolescent Relationship Quality (PARQ): It is a 5-point Likert type scale with 18 items which has been developed by Wissink et al. (25). Each item in the scale is evaluated both for the mother and father, and separate scores are collected for both parents. The validity study of the scale was performed

in Turkey among students attending the primary and secondary schools by Duru et al. (26). The validity and reliability study for university students were performed by Batigun and Say (27), and a 3-factor structure was obtained for mother and father forms as “Explanation”, “Negative mother/father relationship”, and “Positive mother/father relationship”. Cronbach’s alpha reliability coefficients of these factors ranged between 0.85 and 0.92.

UCLA Loneliness Scale: It is a 4-point Likert type scale with 20 items, which has been developed by Russell et al. (28). High scores indicate that loneliness level is high. Turkish validity study was performed by Demir (29), and Cronbach’s alpha and test-retest reliability coefficients were determined as 0.96, and $r=0.94$ ($p<0.001$), respectively.

Multidimensional Anger Inventory (MAI): The scale was developed to measure anger with various dimensions by Balkaya and Sahin (30), and it scored Likert type between 1 and 5 points. Cronbach’s alpha reliability coefficients of dimensions ranged between 0.83 and 0.93. In the present study, 4 dimensions as Anger Symptoms, Factors Causing Anger, Behaviors Related to Anger, and Interpersonal Anger were used. There are sufficient evidences related to validity and reliability of the scale.

Problem Solving Inventory (PSI): It is a 6-point Likert type scale with 35 items which was developed by Heppner and Petersen (31). Turkish validation was performed by Sahin et al. (32). The higher the total points obtained from the scale, the more the individual feels him/herself insufficient in problem solving abilities. Cronbach’s alpha reliability coefficient was 0.88, and the obtained reliability coefficient was determined as $r=0.81$ ($p<0.001$) by using halving technique.

Procedure

A battery was formed in the study by collecting the scales. Firstly Informed Consent Form and Personal Information Form were applied to participants and

then other scales were applied after sorting in the order to control the sequence effect. Local Ethics Committee approval was obtained from the related university (Decision No:11/148). Scales were applied to participants in their classrooms after informing them about the study and obtaining their informed consents. The application duration of scales was approximately 30-40 minutes. Before analysis, data were reviewed and data cleaning was performed. Firstly, data frequency was measured for each measuring tool, minimum and maximum values were examined, and participants not having z values between -3 and $+3$ were excluded from the study. Obtained data were examined by statistical analysis methods such as correlation variance analysis (ANOVA), and model with multiple mediator test (Bootstrap). Bootstrap method was chosen because it gave more correct results in small sample sizes; it did not require to satisfy normal distribution hypothesis; it enabled evaluation of effects of multiple-directed mediated variables both separately and concomitantly; and it could define whether mediatory variables could function independently from each other (33,34).

RESULTS

Results Related to Internet Use

It was determined that the mean duration of internet use among students was 2.03 hours ($S=0.95$). Nearly half of participants (49.5%) spared 3 to 5 hours to use internet. While 23.9% of the sample used internet both for communication and providing knowledge, 54.0% reached internet through their cellular phones. It was observed that there was an equal distribution of causes of internet use. It was noted that number of participants using some websites for a short-time duration (50.0%), and using a few websites for a longer time (50.0%) were equal. The correlation coefficient between problematic internet use and daily duration of internet use was 0.36 ($p<0.001$), whereas the correlation coefficient between problematic internet use and social sharing sites was determined as 0.33 ($p<0.001$).

In the study context, the means of sample scores which are obtained in OCS, and participants who received scores (120.30) one standard deviation (30.00) above the mean value (90.30) were accepted as “higher problematic internet user”, whereas who received scores one standard deviation below (60.30) were accepted as “lower problematic internet user”. In the present study, 66 participants received scores one standard deviation above the mean, which indicated that their problematic internet use was higher. These participants made up of 16.4% of the sample, and they used internet 2.7 (SD=1.23) hours in a day.

Results Related to Sociodemographic Variables

To determine whether scores obtained from OCS differed according to gender and socioeconomic level (SEL), the marker was defined as education level of the mother. After participants with mothers graduated from the primary school were classified as “low SEL”, from the secondary and high school were classified as “moderate SEL”, and from university were classified as “high SEL”; two variable variation analysis (ANOVA) of “gender (2) x SEL (3)” was performed. At the end of the analysis, it was determined that gender ($F_{1,378}=5.41, p<0.05$) variable had basic effect on scores obtained from OCS. According to the obtained results males (Mean=93.99, SD=30.75) had higher

rates of problematic internet use than females (Mean=87.86, SD=28.62). SEL variable did not have a basic effect ($F_{2,378}=0.03, p>0.05$). Additionally, there was no interventional effect ($F_{2,378}=1.64, p>0.05$).

Correlation Analyses

Pearson’s correlation coefficients calculated between variables are shown in Table 1. As shown, correlation coefficients between OCS and PARQ subscales, anger dimensions, PSI, and UCLA-Loneliness Scale ranged from (-0.12) $p<0.01$ to 0.27 ($p<0.001$). Coefficients between total anger score and PSI and UCLA-Loneliness Scale were 0.13 ($p<0.01$), and 0.23 ($p<0.001$), respectively.

Mediatory Variable Analyses

Bootstrap method which is a multiple mediated model test (34) to measure mediatory roles of anger, loneliness, and problem solving abilities between problematic internet use and parent-adolescent relationship quality, and was proposed by Preacher and Hayes (33) was used in the study. Due to mediatory model test, correlations between predictive variables (subdimensions related to parents) and predicted variables (problematic internet use) were investigated, and analysis was performed between correlated

Table 1: Correlation coefficients between variables

	2	3	4	5	6	7	8	9	10	11	12	13	14
1	0.01	0.24***	-0.12**	0.20***	-0.10	-0.03	0.27***	0.07	0.27***	0.18***	0.18***	0.21***	0.23***
2	-	-0.03	0.70***	0.07	0.32***	0.62***	-0.01	0.10	-0.04	-0.11**	0.01	-0.07	-0.20***
3	-	-	-0.22***	0.47***	-0.15**	-0.05	0.24***	-0.01	0.21***	0.26***	0.20***	0.18***	0.17***
4	-	-	-	-0.05	0.54***	0.44***	-0.07	0.07	-0.12**	-0.08	-0.05	-0.09	-0.25***
5	-	-	-	-	-0.28***	0.02	0.21***	0.03	0.18***	0.21***	0.19***	0.18	0.10
6	-	-	-	-	-	0.66***	-0.11**	-0.01	-0.15**	-0.05	-0.10*	-0.09	-0.16***
7	-	-	-	-	-	-	-0.01	0.03	-0.06	-0.08	-0.03	-0.07	-0.18***
8	-	-	-	-	-	-	-	0.31***	0.45***	0.45***	0.64***	0.21***	0.13**
9	-	-	-	-	-	-	-	-	0.38***	0.19***	0.74***	-0.008	-0.24***
10	-	-	-	-	-	-	-	-	-	0.47***	0.84***	0.14**	0.04
11	-	-	-	-	-	-	-	-	-	-	0.63***	0.29***	0.06
12	-	-	-	-	-	-	-	-	-	-	-	0.13**	-0.05
13	-	-	-	-	-	-	-	-	-	-	-	-	0.23***

- 1. Online Cognitive Scale
- 2. Mother’s Explanation
- 3. Negative Mother-Adolescent Relationship
- 4. Positive Mother-Adolescent Relationship
- 5. Negative Father-Adolescent Relationship
- 6. Positive Father-Adolescent Relationship
- 7. Father’s Explanation
- 8. Signs of Anger
- 9. Factors Related to Anger
- 10. Interpersonal Anger
- 11. Behaviors Related to Anger
- 12. Total Score of Anger Scale
- 13. Problem Solving Ability Inventory
- 14. UCLA Loneliness Scale

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

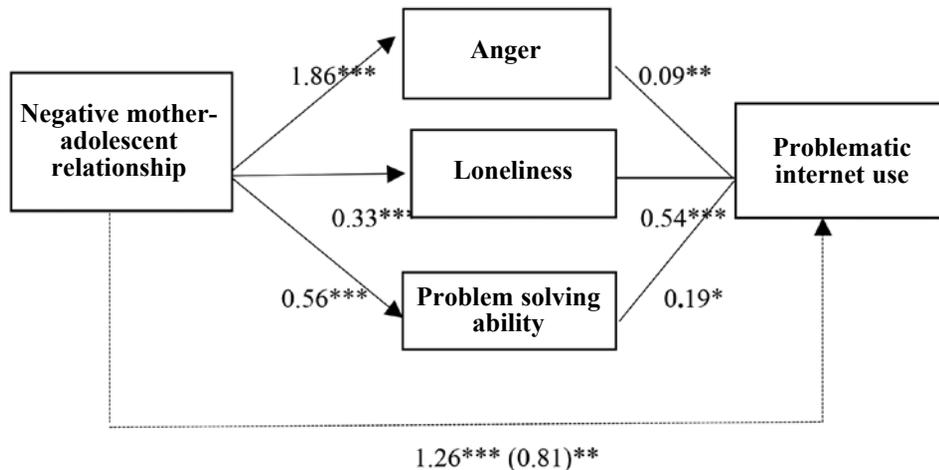


Figure 1: Mediatory roles of anger, loneliness, and problem solving ability scores between parent-adolescent relationship, and problematic internet use.

Non-standardized beta values are given in the figure. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 2: Point Estimations and confidence intervals for total and specific effects on problematic internet use

Variable	Point Estimation	Multiplication of Coefficients (Product of coefficients)			95% BCa Confidence Interval	
		SE	z	p	Low	High
Total	0.45	0.11	4.09	<0.001	0.2582	0.7097
Anger	0.16	0.07	2.44	0.01	0.0555	0.3429
Loneliness	0.18	0.06	1.88	0.06	0.0564	0.2699
Problem Solving Abilities	0.11	0.08	2.56	0.01	0.0195	0.3502

BCa: (Bootstrap Method) bias corrected accelerated

variables. In this context, as EIN mother explanation and favorable mother-adolescent subdimensions with father explanation and favorable father-adolescent relationship subdimensions had no significant correlations, they were excluded from the analysis.

In the context of the study, total scores of MAI, UCLA-Loneliness Scale, and PSI were accepted as variables. Correlations between predictive variables and mediatory variables, and also predicted variable and mediatory variables were examined. As there were significant correlations between them they were included in the analysis.

Signs which were related to mediatory effects of negative mother-adolescent relationship and problematic internet use such as anger, loneliness, and problem solving are shown in Figure 1. As shown in Figure 1, negative mother-adolescent relationship had direct effect on predictive variable of problematic internet use ($\beta=1.26$, $t=4.71$, $p<0.001$). Direct effects of

negative mother-adolescent relationship were determined on anger ($\beta=1.86$, $t=4.01$, $p<0.01$), loneliness ($\beta=0.33$, $t=3.36$, $p<0.001$), and problem solving abilities ($\beta=0.56$, $t=3.53$, $p<0.001$). Moreover, it was determined that anger ($\beta=0.09$, $t=3.07$, $p<0.01$), loneliness ($\beta=0.54$, $t=3.92$, $p<0.001$) and problem solving abilities ($\beta=0.19$, $t=0.2.21$, $p<0.05$) had significant and direct effects on problematic internet use. When negative mother-adolescent relationship and anger, loneliness, and problem solving abilities were included in the equation concomitantly, it was observed that the relationship between negative mother-adolescent relationship and problematic internet use was decreased ($\beta=0.81$, $t=3.01$, $p<0.01$). In this context, it was concluded that mediatory variables of anger, loneliness, and problem solving abilities had “partial mediatory” effects between negative mother-adolescent relationship and problematic internet use. Besides, it was observed that the model was significant

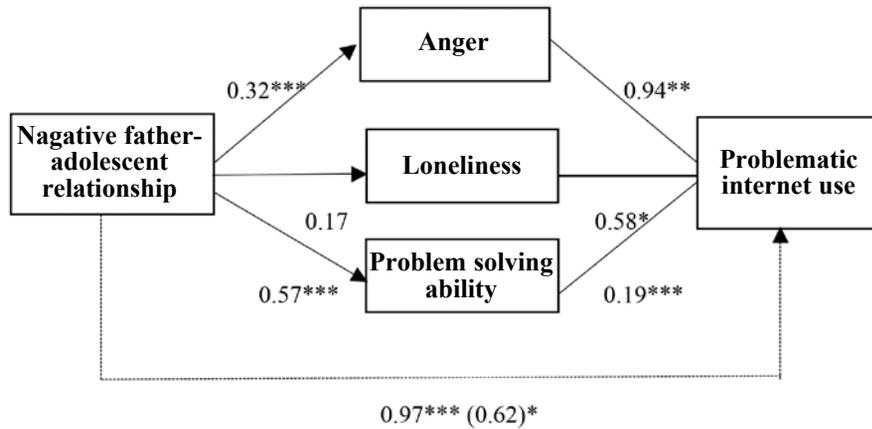


Figure 2: Mediatory roles of total scores of anger, loneliness, and problem solving ability between parent-adolescent relationship, and problematic internet use.

Non-standardized beta values are given in the figure. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

($F_{4,374} = 14.59, p < 0.001$), and variation was 13%. Presence of any partial mediation effects of mediatory variables were investigated on 1000 individuals of bootstrap sampling, and the results are given in Table 2. As it was shown in Table 2, total indirect effects of three mediatory variables were determined significant (point estimation=0.45 and 95% BCa CI [0.2582-0.7097]). If each mediatory variable was examined separately, significant partial mediatory effects were determined between parent-adolescent relationship and problematic internet use, and anger (point estimation=0.17 and 95% BCa CI [0.0555- 0.3429]), loneliness (point estimation=0.18 and 95% BCa CI [0.0564-0.3502]), problem solving abilities (point estimation=0.11 and 95% BCa CI [0.0195-0.2699]).

Signs of mediatory effects caused by anger, loneliness, and problem solving abilities on relationships between negative-adolescent relationship and problematic internet use are shown in Figure 2. As shown in Figure 2, negative father-adolescent relationship had direct effect on predicted variable, problematic internet use ($\beta = 0.97, t = 3.81, p < 0.001$). Although negative father-adolescent relationship had direct effects on mediatory anger ($\beta = 0.32, t = 3.71, p < 0.001$) and problem solving abilities ($\beta = 0.57, t = 3.56, p < 0.001$); no significant direct effect was determined on loneliness ($\beta = 0.17, t = 0.10, p > 0.05$). It was determined that there were statistically significant effects between

mediatory variables, anger ($\beta = 0.94, t = 3.24, p < 0.01$), loneliness ($\beta = 0.58, t = 4.24, p < 0.05$), and problem solving abilities ($\beta = 0.19, t = 4.24, p < 0.001$) and problematic internet use. When negative father-adolescent relationship and all mediatory variables were included in the equation concomitantly, then correlation between negative father-adolescent relationship problematic internet use was decreased ($\beta = 0.62, t = 2.46, p < 0.05$). In this context, it was concluded that mediatory variables had “partial mediatory” effects between father-adolescent relationship and problematic internet use. Additionally, it was observed that all of the model was significant ($F_{4,374} = 13.74, p < 0.001$) and the variation explained 12%.

It is examined on the bootstrap sample of 1000 individuals, whether partial mediatory effects are significant, and the results is given in Table 3. As seen in Table 3, total indirect effects of three mediatory variables were significant (point estimation=0.35 and 95% BCa CI [0.1170-0.5607]). If each variables of anger (point estimation=0.15 and 95% BCa CI [0.0483-0.2997]) and problem solving abilities (point estimation=0.10 and 95% BCa CI [0.0172-0.2339]) are evaluated separately, it is observed that each had significant partial correlation between father-adolescent relationship and problematic internet use, but partial mediatory effect of loneliness (point estimation=0.10 and 95% BCa CI [-0.0001-0.2538]) is insignificant.

Table 3: Point Estimations and confidence intervals for total and specific effects on problematic internet use

Variable	Multiplication of Coefficients (Product of coefficients)				95% BCa Confidence Interval	
	Point Estimation	SE	z	p	Low	High
Total	0.35	0.10	3.50	<0.001	0.1770	0.5607
Anger	0.15	0.06	2.45	0.01	0.0483	0.2997
Loneliness	0.10	0.06	1.65	0.06	-0.0001	0.2538
Problem Solving Abilities	0.10	0.05	1.88	0.01	0.0172	0.2339

BCa: (Bootstrap Method) bias corrected accelerated

DISCUSSION

Primarily, relationships between characteristics of internet use and problematic internet use were investigated. The correlation analyses revealed positive correlations between daily duration of internet use, daily duration of social sharing sites and total score of OCS. In such conditions, it may be said that individuals with problematic internet use spent more time in the internet and used social sharing sites more. There are previous studies supporting this finding in the literature (3,35-39). In another words, internet is more commonly used for interactions and amusement such as games and social media use, and as duration of internet use is increased, problematic internet use is also increased.

Additionally, rate of individuals with problematic internet use was determined as 16.4% in the study. There are many different rates about this issue in the literature. For example, while it was reported low rates as 1% (40) in some studies, rates reaching up to 19% (3) and 80% (1) were reported in some studies. It was reported that this condition was resulted from different factors used for definition of problematic internet use, but it was pointed that study methods might also be effective (41). In the present study, it might be considered that this ratio indicated areas with one standard deviation above for the mean OCS. In other words, the scale used was not standardized for the risk group, and such high ratios might not be observed while using such a standardized scale.

In the study, problematic internet use was also investigated for age and SEL variables, and it was determined that males had significantly higher score than females in OCS. There are many study results consistent with this finding (2-4,42). This condition

can be explained as males are more interested in technological improvements (43) or male use computers more commonly, and go to places like internet cafe more frequently (44). Moreover, it should also be considered that addiction is more commonly encountered among males.

In the present study, mediatory roles of anger, problem solving abilities, and loneliness were investigated between problematic internet use and parent-adolescent relationship quality. As a result of analyses, mediatory roles of three variables were determined between negative mother-adolescent relationship and negative father-adolescent relationship. It was shown in the related literature that these variables were closely related to problematic internet use. For example, Ahmadi and Saghafi (45) reported in their study that relationship quality of family was the most important factor in problematic internet use. Negative relationships with mothers were evaluated as a factor in internet addiction of the adolescent (5,6). Additionally, there were studies emphasizing that negative relationship with the father was more effective than negative relationship with mother in problematic internet use (46). Besides, it was observed that if negative mother-adolescent relationship was the predictive variable, it was observed that loneliness had a partial mediatory effect. If there was negative father-adolescent relationship, then loneliness did not have partial mediatory effect. When the literature related to parent-adolescent relationship was reviewed, it was determined that adolescents had closer relationships with their mother than their fathers (46). Therefore, it might be told that adolescents had more limited relationships with their fathers. In the present study,

it may be thought that mediatory effect of loneliness may differ according to mother and father in relationship with this issue. In such a way that, relationship with father is not close enough, so it decreases significance of negative relationship with the father, and it may remove mediatory effect of loneliness between negative father-adolescent and problematic internet use. However, warm relationship with the mother is a protective factor for loneliness, so it is more probable that loneliness may have a mediatory effect between mother-adolescent relationship and problematic internet use.

Relationships between parental attitudes and problem solving abilities are unknown (47). Problem solving ability of adolescents whose parents behave protective or authoritative is decreased. According to Sivrikaya et al. (48) problem solving ability was increased as familial social support was increased.

The literature reviewing about problematic internet use and anger is also supporting the study results. In other words, as problematic internet use was increased, anger level of individuals was also increased (17,19,49). Besides, Muris et al. (50) claimed that parental growth styles were effective on anger and hostility. There are findings that insufficiency in familial functionality, insufficient parental interest on adolescents and parents showing their anger expressions increase anger behaviors in adolescents (51).

Problem solving ability was another variable which was investigated in the present study. As problematic internet use was increased, problems in problem solving were also increased. There are not many studies performed with these two variables together in the literature. In a small number of study, it was reported that there was a strong correlation between problematic internet use and problem solving ability (22).

In conclusion, these obtained data provide beneficial clues in prevention of problematic internet use, which is a common problem in our decade, and in development of intervention programs targeting the treatment. Strengthening relationships of individuals

with problematic internet use and their parents may be provided in psychological consultancy and psychotherapy performances. Besides, interventions which will be performed to improve communication skills, anger control, and problem solving fields, may decrease in problematic internet use in these individuals by evaluating loneliness, and anger levels as well as their problem solving ability. Thus, it is believed that the present study may have significant contributions for healthcare professionals.

Relationships between problem solving ability and problematic internet use are very rarely investigated in the current literature. Therefore, it is believed that results of the present study will contribute to the related literature, and may be a resource for further studies.

Our study has some limitations. Firstly, majority of samples have been obtained from students attending universities in the city of Ankara, and no data was collected from other cities and universities. This limits the generalization of study results. Secondly, data have been collected by self-reporting scales, so there is the possibility that participants may respond in much more positive approaches. Moreover, there are many statements in scales applied to participants. This may have caused decreased concentration and motivation of participants.

Contribution Categories	Name of Author
Development of study idea	G.S.
Methodological design of the study	G.S., A.D.B.
Data acquisition and process	G.S.
Data analysis and interpretation	G.S., A.D.B.
Literature review	G.S.
Manuscript writing	G.S., A.D.B.
Manuscript review and revision	G.S., A.D.B.

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REFERENCES

1. Young KS. Internet addiction: The emergence of a new clinical disorder. *Cyberpsychol Behav* 2009; 1:237-244. **[CrossRef]**
2. Willoughby T. A short-term longitudinal study of internet and computer game use by adolescent boys and girls: prevalence, frequency of use, and psychosocial predictors. *Dev Psychol* 2008; 44:195-204. **[CrossRef]**
3. Batigun AD, Kilic N. Associations between internet addiction and personal characteristics, social support, psychological symptoms, and some socio-demographic variables. *Turkish Journal of Psychology* 2011; 26:1-10. (Turkish)
4. Ha Y, Hwang WJ. Gender differences in internet addiction associated with psychological health indicators among adolescents using a national web-based survey. *Int J Ment Health Addict* 2014; 12:660-669. **[CrossRef]**
5. Xu J, Shen LX, Yan CH, Hu H, Yang F, Wang L, Kotha SR, Ouyang F, Zhang LN, Liao XP, Zhang J, Zhang JS, Shen XM. Parent-adolescent interaction and risk of adolescent internet addiction: a population-based study in Shanghai. *BMC Psychiatry* 2014; 14:112. **[CrossRef]**
6. Yang CY, Sato T, Yamawaki N, Miyata M. Prevalence and risk factors of problematic internet use: a cross-national comparison of Japanese and Chinese university students. *Transcult Psychiatry* 2013; 50:263-279. **[CrossRef]**
7. Darling N, Steinberg L. Parenting style as context: an integrative model. *Psychol Bull* 1993; 113:487-496. **[CrossRef]**
8. Wang JN, Liu L, Wang L. Prevalence and associated factors of emotional and behavioural problems in Chinese school adolescents: a cross-sectional survey. *Child Care Health Dev* 2014; 40:319-326. **[CrossRef]**
9. Durkee T, Kaess M, Carli V, Parzer P, Wasserman C, Floderus B, Apter A, Balazs J, Barzilay S, Bobes J, Brunner R, Corcoran P, Cosman D, Cotter P, Despalins R, Graber N, Guillemin F, Haring C, Kahn JP, Mandelli L, Marusic D, Mészáros G, Musa GJ, Postuvan V, Resch F, Saiz PA, Sisask M, Varnik A, Sarchiapone M, Hoven CW, Wasserman D. Prevalence of pathological internet use among adolescents in Europe: demographic and social factors. *Addiction* 2012; 107:2210-2222. **[CrossRef]**
10. Cevik GB, Celikkaleli O. Adolescent's friends attachment and internet addiction according to gender, perception parents attitudes and parents educational levels. *Journal of Cukurova University Institute of Social Sciences* 2010; 19:225-240. (Turkish)
11. Weiss RS. *Loneliness: The Experience of Emotion and Social Isolation*. Cambridge: MIT Press, 1973.
12. Bozoglan B, Demirer V, Sahin I. Loneliness, self-esteem, and life satisfaction as predictors of Internet addiction: a cross-sectional study among Turkish university students. *Scand J Psychol* 2013; 54:313-319. **[CrossRef]**
13. Morsunbul U. The association of internet addiction with attachment styles, personality traits, loneliness and life satisfaction. *International Journal of Human Sciences* 2014; 11:357-372.
14. van den Eijnden RJ, Meerkerk GJ, Vermulst AA, Spijkerman R, Engels RC. Online communication, compulsive internet use, and psychosocial well-being among adolescents: a longitudinal study. *Dev Psychol* 2008; 44:655-665. **[CrossRef]**
15. Morahan-Martin J, Schumacher P. Loneliness and social use of internet. *Comput Human Behav* 2003; 19:659-671. **[CrossRef]**
16. Budak S. *Psychology Dictionary*. Ankara: Bilim ve Sanat Yayinlari, 2005. (Turkish)
17. Hwang JY, Choi JS, Gwak AR, Jung D, Choi SW, Lee J, Lee JY, Jung HY, Kim DJ. Shared psychological characteristics that are linked to aggression between patients with Internet addiction and those with alcohol dependence. *Ann Gen Psychiatry* 2014; 13:6. **[CrossRef]**
18. Ata EE, Akpınar S, Kelleci M. The relationship between students problematic internet usage and their anger expression manner. *TAF Preventive Medicine Bulletin* 2011; 10:473-480. **[CrossRef]** (Turkish)
19. Senormanci O, Konkan R, Guclu O, Senormanci G. Depression, loneliness, anger behaviours and interpersonal relationship styles in male patients admitted to internet addiction outpatient clinic in Turkey. *Psychiatr Danub* 2014; 26:39-45.
20. D'Zurilla TJ, Goldfried MR. Problem solving and behavior modification. *J Abnorm Psychol* 1971; 78:107-126. **[CrossRef]**
21. Goldberg I. Internet addictive disorder (IAD) diagnostic criteria, <http://www.psychom.net/iadcriteria.html>, 1997. Access date April 15, 2015.
22. Ekinci B. The relationship between problematic internet entertainment use and problem solving skills among university students. *Int J Ment Health Addict* 2014; 12:607-617. **[CrossRef]**
23. Davis RA, Flett GL, Besser A. Validation of a new scale for measuring problematic internet use: implications for pre-employment screening. *Cyberpsychol Behav* 2002; 5:331-345. **[CrossRef]**
24. Ozcan NK, Buzlu S. An assistive tool in determining problematic internet use: validity and reliability of the "Online Cognition Scale" in a sample of university students. *Journal of Dependence* 2005; 6:19-26. (Turkish)

25. Wissink IB, Dekovic M, Meijer AM. Parenting behavior, quality of the parent-adolescent relationship, and adolescent functioning in four ethnic groups. *J Early Adolesc* 2006; 26:133-159. **[CrossRef]**
26. Duru AG, Ucanok Z, Topcu AE. Testing relationships between negative life events, parent-adolescent relationship, and adolescent compliance in the context of family stress model: an observational study. Scientific Research Unit of Ankara University (Project No: 11B5358001), 2014. (Turkish)
27. Batigun AD, Say G. Quality of Parent-Adolescent Relationship Scale of psychometric properties on university students. *Journal of Clinical Psychiatry* 2015; 18:49-58. (Turkish)
28. Russell D, Peplau LA, Cutrona CE. The revised UCLA Loneliness Scale: concurrent and discriminant validity evidence. *J Pers Soc Psychol* 1980; 39:472-480. **[CrossRef]**
29. Demir A. Validity and reliability of UCLA Loneliness Scale. *Turkish Journal of Psychology* 1989; 7:14-18. (Turkish)
30. Balkaya F, Sahin NH. Multidimensional anger scale. *Turk Psikiyatri Derg* 2003; 14:192-202. (Turkish)
31. Heppner PP, Petersen CH. The development and implications of a personal problem-solving inventory. *J Couns Psychol* 1982; 29:66-75. **[CrossRef]**
32. Sahin N, Sahin NH, Heppner PP. Psychometric properties of the problem solving inventory in a group of Turkish university students. *Cognit Ther Res* 1993; 17:379-396. **[CrossRef]**
33. Preacher KJ, Hayes AF. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behav Res Methods* 2008; 40:879-891. **[CrossRef]**
34. Hayes AF, Preacher KJ. Statistical mediation analysis with a multicategorical independent variable. *Br J Math Stat Psychol* 2014; 67:451-470. **[CrossRef]**
35. Choi YJ. Investigating Koreans' internet use patterns and motivations, and exploring vulnerability of internet dependency. Unpublished dissertation, 2001.
36. Eldeleklioglu J, Vural-Batik M. Predictive effects of academic achievement, internet use duration, loneliness and shyness on internet addiction. *Hacettepe University Journal of Education* 2013; 28:141-152.
37. Bruno A, Scimeca G, Cava L, Pandolfo G, Zoccali RA, Muscatello MRA. Prevalance of internet addiction in a sample of southern Italian high school students. *Int J Ment Health Addict* 2014; 12: 708-715. **[CrossRef]**
38. Hawi NS. Internet addiction among adolescents in Lebanon. *Comput Human Behav* 2012; 28:1044-1053. **[CrossRef]**
39. Batigun AD, Hasta D. Internet addiction: an evaluation in terms of loneliness and interpersonal relationship styles. *Anatolian Journal of Psychiatry* 2010; 11:213-219.
40. Bayraktar F, Gun Z. Incidence and correlates of internet usage among adolescents in North Cyprus. *Cyberpsychol Behav* 2007; 10:191-197. **[CrossRef]**
41. Yellowlees PM, Marks S. Problematic internet use or internet addiction? *Comput Human Behav* 2007; 23:1447-1453. **[CrossRef]**
42. Krishnamurthy S, Chetlapalli SK. Internet addiction: Prevalence and risk factors: A cross-sectional study among college students in Bengaluru, the Silicon Valley of India. *Indian J Public Health* 2015; 59:115-121. **[CrossRef]**
43. Servidio R. Exploring the effects of demographic factors, internet usage and personality traits on internet addiction in a sample of Italian university students. *Comput Human Behav* 2014; 35:85-92. **[CrossRef]**
44. Horzum MB. Examining computer game addiction level of primary school students in terms of different variables. *Education and Science* 2011; 36:56-68. (Turkish)
45. Ahmadi K, Saghafi A. Psychosocial profile of Iranian adolescents' internet addiction. *Cyberpsychology Behav Soc Netw* 2013; 16:543-548. **[CrossRef]**
46. Liu QX, Fang XY, Zhou ZK, Zhang JT, Deng LY. Perceived parent-adolescent relationship, perceived parental online behaviors and pathological internet use among adolescents: gender-specific differences. *PloS One* 2013; 8:e75642. **[CrossRef]**
47. Arslan G, Kabasakal Z. Investigation of relationships between attitudes of parent and problem solving skills of adolescents. *Turkish Studies* 2013; 8:33-42. **[CrossRef]** (Turkish)
48. Sivrikaya AH, Kaya M, Ozmutlu I. Investigating the relationship between university students' perceived social supports from family and friends and problem solving skills. *Nigde University Journal of Physical Education and Sport Sciences* 2013; 7:28-33.
49. Ko CH, Yen JY, Liu SC, Huang CF, Yen CF. The associations between aggressive behaviors and internet addiction and online activities in adolescents. *J Adolesc Health* 2009; 44:598-605. **[CrossRef]**
50. Muris P, Meesters C, Morren M, Moorman L. Anger and hostility in adolescents: relationships with self-reported attachment style and perceived parental rearing style. *J Psychosom Res* 2004; 57:257-264. **[CrossRef]**
51. Avci R, Guçray SS. An investigation of violent and nonviolent adolescents' family functioning, problems concerning family members, anger and anger expression. *Educational Sciences: Theory & Practice* 2010; 10:45-76.